

WE CLAIM:

1. A line generating device, comprising:
  - a housing;
  - a light source mounted within the housing;
  - a power supply connected to the light source;
  - a projection lens that receives light and projects the light in the shape of a fan;
  - at least one reference level on an outside of the housing; and
  - a pin that is movable from a first position, wherein the pin is incapable of contacting a surface exterior of the line generating device, to a second position wherein the pin is capable of contacting the surface.
2. The device of Claim 1, wherein the light source generates a laser beam.
3. The device of Claim 2, wherein the laser beam has an asymmetric intensity pattern.
4. The device of Claim 1, wherein the housing comprises a support face that substantially extends along a first planar surface and the fan substantially lies within a second planar surface that intersects the first plane surface at an angle.
5. The device of Claim 4, wherein the angle is about 90°.
6. The device of Claim 4, wherein the light projects a line in a direction generally parallel to the first planar surface, the line extending in a direction of propagation of the light.

7. The device of Claim 1, wherein the power supply is a battery mounted within the housing and switchably connected to the light source.

8. The device of Claim 1, wherein the at least one reference level comprises a bubble level.

9. The device of Claim 1 wherein the at least one reference level comprises two bubble levels oriented at right angles to each other.

10. The device of Claim 1, further comprising an aperture in the housing.

11. The device of Claim 1, wherein a corner of the lens has a radius of about 0.030 inches to about 0.060 inches.

12. The device of Claim 11, wherein the corner of the lens has a radius of about 0.047 inches.

13. The device of Claim 1, wherein the light in the shape of a fan is projectable as a visible line extending at least about 5 lengths of the housing from the housing.

14. The device of Claim 1, further comprising a collimating optics that receives light from the light source and focuses the light into an ovate shape for the projection lens.

15. The device of Claim 1, wherein the projection lens is made from glass or plastic.

16. The device of Claim 1, further comprising an aperture in the housing, the aperture providing an exit for the light and a lens cover switchably connected to the power supply, wherein when the lens cover moves to a first lens cover position the light source is connected to the power supply and the lens cover does not substantially block the exit and when the lens cover moves to a second lens cover position the light source is not connected to the power supply and the lens cover substantially blocks the exit.

17. The device of Claim 1, wherein the housing defines an opening through which the pin extends through when moving from the first position to the second position.

18. The device of Claim 1, further comprising a lever for pushing and holding the pin into the surface.

19. The device of Claim 1, wherein the pin is mounted to the housing.

20. The device of Claim 19, wherein the pin is at least partially retractable into the housing.

21. The device of Claim 1, wherein the pin moves along an axis from the first position to the second position.

22. A line generating device, comprising:

a housing comprising a support face that substantially extends along a first planar surface and the fan substantially lies within a second planar surface that intersects the first plane surface at an angle;

a light source mounted within the housing;

a power supply connected to the light source;  
a projection lens that receives light and projects the light in the shape of a fan that substantially lies within a second planar surface that intersects the first plane surface at an angle;  
at least one reference level on an outside of the housing; and  
a pin that is movable from a first position, wherein the pin is incapable of contacting a surface exterior of the line generating device, to a second position wherein the pin is capable of contacting the surface.

23. The device of Claim 22, further comprising a lever for pushing and holding the pin into the surface.

24. The device of Claim 22, wherein the light in the fan-shaped beam has an asymmetric intensity.

25. The device of Claim 22, wherein the light projects a line in a direction generally parallel to the first planar surface, the line extending in a direction of propagation of the light.

26. The device of Claim 22, wherein the power supply is a battery mounted within the housing and switchably connected to the light source.

27. The device of Claim 22, wherein the at least one reference level comprises a bubble level.

28. The device of Claim 22, wherein the at least one reference level comprises two bubble levels oriented at right angles to each other.

29. The device of Claim 22, further comprising an aperture in the housing.

30. The device of Claim 22, wherein a corner of the lens has a radius of about 0.030 inches to about 0.060 inches.

31. The device of Claim 30, wherein the corner of the lens has a radius of about 0.047 inches.

32. The device of Claim 22, wherein the light in the shape of a fan is projectable as a visible line extending at least about 5 lengths of the housing from the housing.

33. The device of Claim 22, further comprising a collimating optics that receives light from the light source and focuses the light into an ovate shape for the projection lens.

34. The device of Claim 22, wherein the projection lens is made from glass or plastic.

35. The device of Claim 22, further comprising an aperture in the housing, the aperture providing an exit for the light and a lens cover switchably connected to the power supply, wherein when the lens cover moves to a first lens cover position the light source is connected to the power supply and the lens cover does not substantially block the exit and when the lens cover moves to a second lens cover position the light source is not connected to the power supply and the lens cover substantially blocks the exit.

36. The device of Claim 22, wherein the housing defines an opening through which the pin extends through when moving from the first position to the second position.

37. The device of Claim 22, wherein the pin is mounted to the housing.

38. The device of Claim 37, wherein the pin is at least partially retractable into the housing.

39. The device of Claim 22, wherein the pin moves along an axis from the first position to the second position.

40. A method for projecting a fan-shaped laser light generated from a line generating device onto a surface, the method comprising:

moving a pin of the line generating device from a first position, wherein the pin is incapable of contacting the surface, to a second position wherein the pin is capable of contacting the surface;

mounting the line generating device onto the surface by inserting a portion of the pin, which is located at the second position, into the surface;

focusing a light into a fan shape that substantially lies within a plane; and

projecting the fan-shaped light in a direction of propagation that is oriented at an angle with respect to the plane.

41. The method of Claim 40, wherein the direction of propagation is oriented at about 90° with respect to the plane.

42. The method of Claim 40, wherein the light is substantially monochromatic.

43. The method of Claim 40, further comprising forming a line on a surface of interest.

44. The method of Claim 40 further comprising pivoting the fan-shaped light onto the surface of interest.

45. The method of Claim 40 further comprising orienting and leveling the fan-shaped light.

46. A line generating device, comprising:

a housing comprising a pin mounted on a face of the housing, wherein the pin is movable from a first position, wherein the pin is incapable of contacting a surface exterior of the line generating device, to a second position wherein the pin is capable of contacting the surface;

a light source mounted within the housing; and

a power supply connected to the light source.

47. The device of Claim 46, further comprising at least one lens that receives light from the light source.

48. The device of Claim 46, further comprising at least one lens that receives light from the light source.

49. The device of Claim 46, wherein the light source comprises a laser light source.

50. The device of Claim 48, wherein the at least one lens that receives light from the light source projects the light as a fan-shaped beam.

51. The device of Claim 46, further comprising at least one reference level on the housing.

52. The device of Claim 46, wherein the housing defines an opening through which the pin extends through when moving from the first position to the second position.

53. The device of Claim 50, wherein the light in the fan-shaped beam has an asymmetric intensity.

54. The device of Claim 46, wherein the pin is mounted to the housing.

55. The device of Claim 54, wherein the pin is at least partially retractable into the housing.

56. The device of Claim 46, wherein the pin moves along an axis from the first position to the second position.

57. A method of aligning an object with a light beam generated from a line generating device onto a surface, the method comprising:  
moving a pin of the line generating device from a first position, wherein the pin is incapable of contacting the surface, to a second position wherein the pin is capable of contacting the surface;  
mounting the line generating device onto the surface by inserting a portion of the pin, which is located at the second position, into the surface;  
generating light along a direction of propagation so that a line is formed along a first planar surface, wherein the line is interruptible in that should an impediment be positioned on the line, the line will be present on either side of the impediment; and  
placing an object so that a portion of the object is aligned by the light.

58. The method of Claim 57, wherein the method generates light in the shape of a fan that lies substantially in a second planar surface that intersects the first planar surface at an angle.

59. The method of Claim 58, wherein the angle is about  $90^{\circ}$ .

60. The method of Claim 57, further comprising focusing the light into a fan-shaped beam offset from the surface by a distance.

61. A method for projecting a fan-shaped laser light generated from a line generating device onto a vertical surface, the method comprising:

attaching the line generating device to the vertical surface, wherein gravity acts on the line generating device parallel to the vertical surface;  
focusing a light into a fan shape that substantially lies within a plane;  
and

projecting the fan-shaped light in a direction of propagation that is oriented at an angle with respect to the plane.

62. The method of Claim 61, wherein the direction of propagation is oriented at about  $90^{\circ}$  with respect to the plane.

63. The method of Claim 61, wherein the light is substantially monochromatic.

64. The method of Claim 61, further comprising forming a line on a surface of interest.

65. The method of Claim 64 further comprising pivoting the fan-shaped light onto the surface of interest.

66. The method of Claim 61 further comprising orienting and leveling the fan-shaped light.

67. The method of claim 61, wherein the attaching comprises inserting a pin through a portion of the device so that the pin pierces the vertical surface.

68. A method of aligning an object with a light beam generated from a line generating device onto a vertical surface, the method comprising:  
attaching the line generating device to the vertical surface, wherein gravity acts on the line generating device parallel to the vertical surface;  
generating light along a direction of propagation so that a line is formed along a first planar surface, wherein the line is interruptible in that should an impediment be positioned on the line, the line will be present on either side of the impediment; and  
placing an object so that a portion of the object is aligned by the light.

69. The method of Claim 68, wherein the method generates light in the shape of a fan that lies substantially in a second planar surface that intersects the first planar surface at an angle.

70. The method of Claim 69, wherein the angle is about  $90^\circ$ .

71. The method of Claim 68, further comprising focusing the light into a fan-shaped beam offset from the surface by a distance.

72. The method of Claim 68 further comprising orienting and leveling the light.

73. The method of claim 68, wherein the attaching comprises inserting a pin through a portion of the device so that the pin pierces the vertical surface.

74. A method for projecting a fan-shaped laser light generated from a line generating device, the method comprising:

- attaching the line generating device to a surface;
- focusing a light into a fan shape that substantially lies within a plane;
- projecting the fan-shaped light in a direction of propagation that is oriented at an angle with respect to the plane; and
- removing the line generating device from the surface.

75. The method of Claim 74, wherein the direction of propagation is oriented at about 90° with respect to the plane.

76. The method of Claim 74, wherein the light is substantially monochromatic.

77. The method of Claim 74, further comprising forming a line on a surface of interest.

78. The method of Claim 77 further comprising pivoting the fan-shaped light onto the surface of interest.

79. (new) The method of Claim 74 further comprising orienting and leveling the fan-shaped light.

80. A method of aligning an object with a light beam generated from a line generating device onto a surface, the method comprising:  
attaching the line generating device to the surface;

generating light along a direction of propagation so that a line is formed along a first planar surface, wherein the line is interruptible in that should an impediment be positioned on the line, the line will be present on either side of the impediment;

placing an object so that a portion of the object is aligned by the light;  
and

removing the line generating device from the surface.

81. The method of Claim 80, wherein the method generates light in the shape of a fan that lies substantially in a second planar surface that intersects the first planar surface at an angle.

82. The method of Claim 81, wherein the angle is about  $90^\circ$ .

83. The method of Claim 80, further comprising focusing the light into a fan-shaped beam offset from the surface by a distance.

84. The method of Claim 80 further comprising orienting and leveling the light.